

88
N2

ROLE OF GOVERNMENT IN FOSTERING SMALL SCALE INDUSTRY

A paper by B.H. Olsson, Director, Defence Scientific Establishment, Ministry of Defence, for presentation to the Workshop "Small Scale/High Value" to be held in Wellington on 20-22 September 1977.



THE DEPARTMENT OF FOREST AND RANGELANDS

REPORT OF THE FOREST AND RANGELANDS DEPARTMENT
FOR THE YEAR 1900

CONTENTS

<u>SECTION</u>	<u>PAGE</u>
PREFACE	2
I A TIME FOR CHANGE	3
Small Scale Industry	3
II GOVERNMENT AND SMALL FIRMS - OVERSEAS ATTITUDES	4
Definitions	4
U.S. Government Support of Small Business	5
Situation in the United Kingdom	6
Government Discrimination in Favour of Large Business Enterprises	8
Recommendations of the Bolton Committee	10
Recent U.S. Research on Government and Small Business	11
III NEW ZEALAND GOVERNMENT POLICY ON SMALL FIRMS	13
Overriding Principles	13
What More can Government do for Small Firms?	15
Research and Development	16
Government Purchasing	20
Defence Purchasing	21
Taxation	26
Finance	27
IV OTHER PROBLEMS OF SMALL FIRMS	28
Growth Rate	28
Excessive Paper Work	29
Capital Equipment Pool	29
Weak Technology Base	29
V GOVERNMENT PURCHASING	30
Its Potential for Inducing Growth	30
Pre-production Orders	30
Testing and Field Trials	33
Specifications	34
Tenders	35
Offsets	36
The "Gold Star" Concept	37
Program Manager	38
VI SUMMARY	39
REFERENCES	40
APPENDIX I PRE-PRODUCTION ORDERS	42
APPENDIX II FIELD TESTS	44

This paper does not necessarily represent the views of the Ministry of Defence.

1000000

1000000

1000000

1000000

1000000

1000000

1000000

1000000

1000000

1000000

1000000

1000000

PREFACE

Overseas governments have played a major role in fostering the growth of small firms. The New Zealand Government also has a policy of supporting the growth of local industry of which small firms are a significant part. However, the policy is not being followed up by effective action.

Positive use can be made of the power of Government purchasing to assist small firms, as is done overseas. Strong directives by Government on the use of local industry whenever possible, accompanied by a vigorous campaign to secure offsets to the extent of at least 25-30% of all overseas orders, would play a big part in assisting local industry, large as well as small.

Some problems of small firms are discussed and possible solutions are suggested.

Business government, which is the only one in the world, is the only one that has a policy of "no business in business". The only one that has a policy of "no business in business" is the only one that has a policy of "no business in business".

Positive and negative are the two sides of the same coin. Positive is the side that is seen, negative is the side that is not seen. Positive is the side that is seen, negative is the side that is not seen. Positive is the side that is seen, negative is the side that is not seen.

Some people are positive, some are negative. Some people are positive, some are negative. Some people are positive, some are negative.

ROLE OF GOVERNMENT IN FOSTERING SMALL SCALE INDUSTRY

I A TIME FOR CHANGE

In most developed countries, the last few years have brought a major change in public attitudes to Government policies. There are increasingly vociferous pressure groups agitating for economic objectives to be modified in the light of their social and environmental effects.

In his recent Budget speech, the Minister of Finance, the Rt Hon. R D Muldoon said

"Economic growth is not an end in itself. It is, however, a necessary prerequisite to the attainment of our society's individual and collective objectives, whether they be expressed as the spending power of personal incomes, the quality of family life, the quality and quantity of our social services or the economic, social and physical environment in which we and succeeding generations will live." (1)

At the same time, it has been recognised that there must be a greater emphasis on the promotion of efficiency in the use of available resources. Government help or encouragement will be necessary to assist many industries to reorganise for higher productivity.

Small Scale Industry

In this new look at our economy, special attention must be given to small scale industry. Not only do small firms have particular roles which are not filled by large scale industry but, collectively, they also form a significant part of the total industrial force. In New Zealand, some 51 per cent. of the factories employ 10 or fewer people. At the other end of the scale, only 2.2 per cent. of factories have staff in excess of 200. (2)

Page 1

In more detail, the estate of the decedent, who died on January 1, 1968, is being administered by the executor, who is also the sole beneficiary of the estate. The estate consists of the decedent's personal property, real estate, and other assets. The executor is responsible for the collection, management, and distribution of the estate assets.

In the event of the death of the decedent, the executor is authorized to take any action necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office.

The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office.

The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office.

Page 2

The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office. The executor is also authorized to execute any instrument necessary to carry out the duties of the office.

II GOVERNMENT AND SMALL FIRMS - OVERSEAS ATTITUDES

A look at the relationship between governments and small firms overseas will give a background against which we can consider our own position. Two countries will be considered in some detail - the United States of America and the United Kingdom. They represent two different situations. In the United States, the place of small business has been recognised by Government for a long time and there is a range of programs and agencies set up to foster the growth of small business. On the other hand, in the United Kingdom, it is only in the last few years that Government planning to assist small firms has been given much attention.

Definitions

Detailed statistical definitions for a small business or a small firm are available for both the United States and the United Kingdom. However, for our purposes, definitions in more general terms will suffice.

In the United States a small business includes the following:

- "Wholesale: annual receipts from \$5 million to \$15 million depending upon the industry.
- Retail or Service: annual receipts from \$1 million to \$5 million depending upon the industry.
- Construction: annual receipts from \$1 million to \$5 million depending upon the industry.
- Manufacturing: from 250 to 1500 employees depending upon the industry.

In all cases, in order to qualify as a small business, the organisation must be independent and not dominant in its field." (3)

In the United Kingdom, a small firm has been defined as including the following:

- "Manufacturing 200 employees or less
- Retailing turnover £50,000 p.a. or less
- Wholesale trades turnover £200,000 p.a. or less
- Construction 25 employees or less
- Mining/Quarrying 25 employees or less
- Motor Trades turnover £100,000 p.a. or less

The first problem was the lack of a clear definition of the term "unemployment". The second problem was the lack of a clear definition of the term "unemployment". The third problem was the lack of a clear definition of the term "unemployment".

Definition

Definition: Unemployment is the state of being without work, or the condition of being unemployed.

In the United States, the Bureau of Labor Statistics defines unemployment as follows:

Unemployment is the state of being without work, or the condition of being unemployed.

The Bureau of Labor Statistics defines unemployment as follows:

Unemployment is the state of being without work, or the condition of being unemployed.

The Bureau of Labor Statistics defines unemployment as follows:

Unemployment is the state of being without work, or the condition of being unemployed.

The Bureau of Labor Statistics defines unemployment as follows:

Unemployment is the state of being without work, or the condition of being unemployed.

The Bureau of Labor Statistics defines unemployment as follows:

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Unemployment is the state of being without work, or the condition of being unemployed.

Miscellaneous Services	turnover £50,000 p.a. or less
Road Transport	5 vehicles or less
Catering	All excluding multiples and brewery-managed public houses." (4)

Again, it was accepted that a small firm was one that had a relatively small share of its market, was managed by its owners in a personalised way and was independent of larger enterprises.

In the United States, it is estimated that about 12 million organisations fit the definition of small business but this number includes very small "quasi-companies" such as husband/wife teams. In the United Kingdom, the definition includes 96% of all catering and retailing businesses, 94% of all manufacturing businesses and slightly lower percentages for the other industries.

Although these definitions include larger firms than those covered by New Zealand definition, it is believed that the experience of small firms in the United States and the United Kingdom is still of value to us.

U.S. Government Support of Small Businesses

In the United States, the small business community forms a powerful political lobby and has consequently been given appropriate attention. In 1950, both the House and the Senate established a Select Committee on Small Business. In 1953, the Small Business Administration was formed and, in 1958, the Small Business Act made this a permanent agency. Since then much legislation has been passed in favour of the small business community.

The Small Business Administration has a mission to "aid, counsel, assist and protect" the interest of small business concerns. Its work includes:

- a. advocacy for a large sector of U.S. industry
- b. provision of business loans and guarantees for loans and leases
- c. assistance to the Small Business Investment Companies in lending to small companies
- d. management assistance and counselling (mostly free)
- e. ensuring that small business gets an adequate share of federal government contracts
- f. checking where necessary that small firms are competent to bid on particular contracts, and
- g. provision of technology assistance.

Other government agencies supporting the small business community are:

- a. the Office of Minority Business Enterprise in the Department of Commerce;
- b. Private Investment organisations funded by the Office of Minority Business Enterprise;
- c. Community Investment organisations funded the same way;
- d. Government Investment programs;
- e. The Economic Development Administration;
- f. The Bureau of Indian Affairs;
- g. The National Science Foundation;
- h. The Federal Laboratory Consortiums, and
- i. Innovation Centers to "educate potential technological entrepreneurs and innovators."

Small firms are also given favourable tax treatment.

The U.S. small business community has a number of associations through which its needs can be passed to the federal government. The largest of these is the National Federation of Independent Businesses which has nearly half a million members. The National Small Business Association has about 40,000 members while a number of smaller organisations cater for special or regional interests.

Situation in the United Kingdom

In 1971 in the United Kingdom, it was said that

"nowhere in the machine of Government is there a department, branch or section specifically charged with responsibility for policy towards small firms. Neither the Board of Trade nor the Ministry of Technology had such a body, and none has been created since their merger in the Department of Trade and Industry. Nor have the other departments concerned with industry, so far as we are aware, any special arrangements for dealing with small firm questions. In this respect our departmental organisation differs from that of other industrialised countries which we have visited, which have usually found it necessary to create within the machine of Government a focal point with responsibility for policy towards small firms and for carrying out executive

functions concerning them." (4)

"Generally speaking, (Government) policies have not been framed with the interests of small firms particularly in mind, nor in the light of a coherent general policy about the structure of industry; their differential effects as between firms of different sizes and hence their effects on industrial structure, have been largely fortuitous." (4)

These comments come from the report of an official Committee of Enquiry on Small Firms (4) which had been set up under the chairmanship of J.E. Bolton

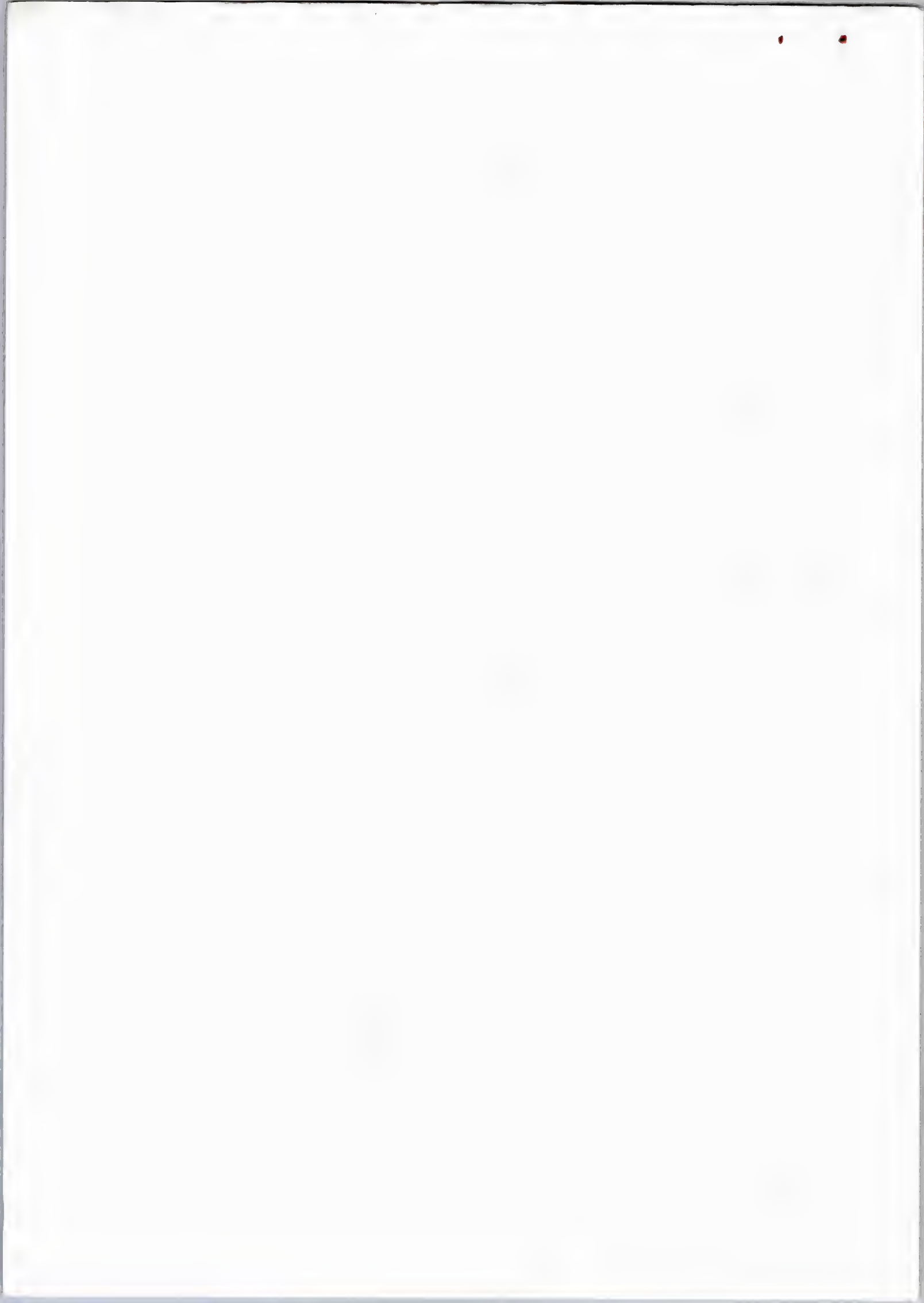
"to consider the role of small firms in the national economy, the facilities available to them and the problems confronting them; and to make recommendations."

The Committee found that there was a malaise among the small firm population whose implications for the growth and efficiency of the sector were serious. It was widely felt that small business enterprise went unrewarded and that the effort was not worthwhile because both Government and society generally failed to recognise their importance. The malaise of small business appeared

"to be compounded of these elements: resentment caused by a long term and irreversible decline in the small businessman's ability to control his environment; a sense of persecution caused by the detrimental side effects, deliberate or not, of the activities of Government; and frustration at the delays and impediments arising from the sheer multiplicity of official regulations and requirements."

It was noted that there was an astonishing contrast between the degrees of political attention paid to small businesses in the United Kingdom and in the United States. Whereas there had been no official study of the small firm sector in Britain before the Bolton Committee, in the United States Select Committees of Congress and the Senate had for many years been collecting information, examining policy and publishing voluminous reports on the state of small business.

The Committee believed that the apparent indifference, and certainly the ignorance, of successive Governments about small firms was in large part



the fault of small businessmen themselves who, in spite of their members, had been extremely ineffective as a pressure group. By 1971, there was still no national organisation claiming to speak for the whole of small business. Clearly it was necessary that so large a sector of the economy should have a more powerful voice in public affairs and the Committee hoped that small business representative bodies would cooperate to present a common front to Government wherever possible.

Before looking at the recommendations of this committee, reference will be made to a belief that prevails among small firms in a number of countries.

Government Discrimination in Favour of Large Business Enterprises

Many small firms hold the view that governments discriminate against small firms or are biased towards large firms.

In the United Kingdom, the Bolton Committee was completely satisfied that there was no deliberate discrimination against small firms. However, it was accepted that discrimination could and did take place through the action of a number of neutral policies. For instance, any reduction in the permitted level of lending by banks and finance houses was neutral in form and no doubt in intention but, given the great dependence of small firms on these institutions for external finance, there was little possibility that it could be wholly neutral in its effects. Discrimination against small firms could arise through an excessive regard for the supposed virtue of large size, this being often equated with great efficiency. Government departments often find it easier to deal with large firms which are accustomed to official procedures in contrast to the small firm which has little inclination to invest managerial time in developing cordial relations with Government. The real administrative cost of Government procedures is relatively much higher for the small firm (whose owner or managing director must personally handle the work) than for the large business (whose administrative section will provide the service).

The position in Canada is shown by the following statements:

"The suspected inequality of support between large and small industry (foreign and Canadian as described by some) is more a function of the inability of the small firm to take full advantage of the opportunities which the government is willing to provide. In this regard, however, it is fair to observe that the government appears to have a less than

full understanding of the nature and administration of small business as compared with large business and is inclined to treat them the same. Taxation policies are substantially the same for both as are rigid administrative and audit regulations in connection with grants and incentives programs - the latter representing a substantial cost to the small firm but probably buried in routine overhead costs of one large firm." (5)

"Returning to the point that the government may have a less than adequate understanding of basic differences between large and small firms, some evidence for this is present in the procurement process. More and more there has been a tendency towards cost-plus contracts with the allowable profit margin being established around the 7% level. To the larger firm with established credit at prime interest rates, cash in the bank and unused productive capacity, a profit level of 7% may be adequate and reasonably attractive. But for the small firm with limited operating cash, paying higher interest rates, and faced with the need to hire extra clerical staff for contract administration (none of which are allowable contract expenses), the profit will be much less than 7% and may be barely adequate to meet machinery and plan depreciation costs. It is clear that large and small firms do not compete on an equal basis." (5)

For the United States, the following quotation summarises the position:

"... federal policies associated with incentivising innovation also fail to capture the key innovational potential of the small business community. They do not operationalize the characteristics which should be found in a small business oriented innovational strategy. In fact, they generally tend to reinforce the patterns already dominant within the economy and therefore contribute to the deterministic tendencies to impose upon the small business community the bureaucratic/institutional inertias and rigidities of the large business/governmental enterprises." (3) (!)

Recommendations of the Bolton Committee (4)

The report of the Committee showed that although the small firm sector remained one of substantial importance in the economy, it was in a state of long term decline. It had been found that the sector was viable because the small firm was in many ways a highly efficient organism, better adapted to the exploitation of certain kinds of economic opportunity than larger units and having some special advantages which derive from the intense commitment of the owner-manager. The Committee found that certain conditions had to be met for the small firm to flourish without subsidy:

- . a good economic climate;
- . the elimination, as far as possible, of the disincentive effects of the fiscal system;
- . the encouragement of more effective and fair competition throughout the economy;
- . effective equality of treatment in every aspect of legislation and Government policy.

To assist in achieving these conditions, the Bolton Committee made 56 recommendations in their report to Parliament. These recommendations can be grouped as follows:

<u>Subject</u>	<u>No. of Recommendations</u>
Small Firms Division of Dept of Trade & Industry	5
Official procurement policies	3
Management advisory services	6
Tax changes	13
Form filling and statistics	15
Competition policy and monopolies	5
Companies Acts	2
Town and Country Planning controls	<u>7</u>
	56

What has come of these? According to information provided by the Office of the British High Commission in Auckland, a question was asked in the House in November 1976 just five years after the recommendations had been implemented. The answer was given that, of the 56 recommendations, 50 had been accepted by Government and had been acted on. The other six recommendations had not been accepted as they conflicted with Government policy or were, in some other way, undesirable.

Recent U.S. Research on Government and Small Business

In spite of the very considerable effort made by the United States Government to assist small business, there is still a feeling there that all is not well. Last year, therefore, the National Science Foundation through its Research Applied to National Needs program commissioned an independent study

"to determine whether there is a more unique, significant, and creative role that can and should be played by the NSF Intergovernmental Science and Technology Program/Industrial Programs (ISPT/IP) in fulfilling the following national objectives:

- . Stimulating more technological innovations from small business which are also important contributions to meeting national needs and objectives.
- . Building a stronger technological base for the small business community and hence for the nation.
- . Retaining and enhancing the special fruitfulness of the small business environment for spawning creative innovations outside the rigidities of dominant bureaucratic patterns.
- . Building the strength of the small business community as a vital component of our national economy and our national life." (3)

The major conclusions of the study were that a significant small business innovation policy gap does exist and that, if it were filled, substantial contributions to the given objectives would result. It was seen that current federal policies are aimed primarily at maintaining small business entities as individual units. However, small businesses are usually specialised in scope and function and may be classified roughly as providing only one of the following:

- . technical and economic research and development;
- . marketing research and analyses;
- . small scale manufacturing;
- . sales, distribution and logistics;
- . finance.

All of these are needed for successful innovation. Large firms cover the range but, for a successful small business strategy, it is now recognised



that federal assistance must be provided to help small firms to act together as a small business community. Extension of present aid to individual firms acting alone is unlikely to achieve anything significant.

A plan of action to achieve this strategy has been proposed and is now being considered. In outline, it involves small business participants subscribing to or contributing their services to an "umbrella type corporation" or alternatively working through a "central coordinator" to attain a team approach. It is foreseen that the small firms should remain independent but work actively together each bringing to the team his own particular expertise and drawing on that of the other members of the team. Then, and only then, is innovation likely to be successful and small firms able to compete on equal terms with large.

Government assistance in this strategy would be given to help establish the necessary groups of small firms but, once they were self sustaining, Government support could be progressively withdrawn.

III NEW ZEALAND GOVERNMENT POLICY ON SMALL FIRMS

Overriding Principles

Before considering what the NZ Government policy on small firms should include, it is wise to see how our society and Government think that economic development generally should proceed. This provides a framework within which any part of our economy can grow but outside of which progress could only be slow.

The report of the Task Force on Economic and Social Planning ⁽⁶⁾ (set up by Government last year under the Chairmanship of Sir Frank Holmes) provides a good source of recent information on the wider view over the way our economy should develop. The Task Force suggests (among other things) that a development strategy should give

- " - high priority to the promotion of:
 - . productivity, invention, innovation and imaginative design;
 - . improvement of industrial training;
 - . application of science and technology to industry;
 - . dissemination of techniques of efficient management;
 - . assistance to efficient enterprises to overcome financial problems impeding development;
- a reduction in administrative restrictions or licensing systems where they adversely affect efficiency;
- review of the tariff with a view to producing a system which, along with policies on assistance to industry and the exchange rate, will give confidence to efficient and potentially efficient producers to expand output;"

These would clearly assist small firms and give plenty of room within which to develop a suitable policy. But does Government take the same point of view?

We can turn to the 1977 Budget ⁽¹⁾ for the answer. This states, in part, that

"The measures to be announced in this Budget represent a package of policies aimed at re-establishing a basis for growth. The objectives of these policies are three-fold:

- . to increase the proportion of national production which is exported;

- . to stimulate the development of efficient import replacement industries;
- . to encourage the better utilisation of our scarce resources, and particularly of imported capital equipment.

For many years, production policies in New Zealand have tended to be based on the needs of industries rather than on the contribution which they are or should be making to the national economy. Last year's Budget represented an important change in direction with its emphasis on the selective application of incentives based on performance, with particular regard to exporting. That emphasis is to be continued and extended. Both businesses and individuals who make the necessary effort will be rewarded."

Later in the Budget, the Minister of Finance said

"... the Government will encourage the growth of those productive activities which are of high priority because they are making an outstanding contribution to economic growth and the balance of payments. The scheme which is being developed will be based on the following principles:

- . priority status will be granted to a productive activity on the basis of a few clear-cut, largely objective, quantitative criteria related to the activity's contribution to growth and the balance of payments;
- . the activities qualifying will form only a small proportion of total manufacturing;
- . assistance measures may include priority treatment by Government departments, priority access to finance, concessional depreciation allowances and exemption from the 10 per cent. sales tax on plant and machinery."

Among other measures, the Minister also announced the establishment of a Small Business Agency, probably within the DFC. This is designed to give special assistance to small businesses and will tackle problems of finance, management and marketing. He said that

"This, together with the successful Applied Technology Programme of the DFC, should go a long way in assisting small businesses to realise the substantial potential they have to contribute to



New Zealand's economic growth."

Clearly, the climate is now very favourable for strengthening the role of Government in fostering small scale industry. Although details of the new Small Business Agency are not yet available, it is probable that this will assist small firms in advisory services. It should also be able to coordinate the work of various types of small firms and thus give the small business community some of the strength they now lack. (Remember that, in the United States, this is seen as the most important way in which Government can help small industry).

However, other measures to give more direct assistance must also be considered.

What More can Government do for Small Firms?

In a paper at the Defence Production Seminar in 1973,⁽⁷⁾ Mr Len Stanners who was then Industry Liaison Officer in the Productivity Centre, Department of Trade and Industries pointed out that the world was extremely sensitive to subsidies being given to manufactured goods for export. He continued:

"All industrial countries, however, do have certain accepted and respectable ways of subsidising the growth of industrial technology. In the main, these lie in the support of research and development in space programmes, nuclear programmes, defence and aviation, and the many thousands of millions of dollars invested by Governments in these four areas each year are responsible for the vast bulk of technological development throughout the world. Very little of significance arises solely from commercially justifiable consumer oriented research and development. It seems unlikely that New Zealand will ever have space or nuclear programmes to contribute to industrial development. We do have a fledgling aviation industry, and I hope that in due course, that can create a spin off. This leaves us with defence production assistance as the main area in which to seek technological spin off in industry. It is a new tool for industrial development and like all new tools, we cannot expect it to produce results until we have learned how to use it."

We shall consider how Government research and development may be used to help small firms and look at the positive role that Government purchasing

(not only for defence but also for other sections of Government) can have in helping all New Zealand industry and, in particular, small firms. Even though it may lead us on to dangerous ground in relation to exports, we must also look at whether or not some variations in the present taxation law would be appropriate in relation to small firms.

Research and Development

In New Zealand, most research and development is carried out by Government laboratories in-house rather than by contracting it out to industry. However, there are strong arguments in favour of giving industry as much as possible of Government research and development. Some overseas comments may be helpful. From Canada,

"Many have argued that the government performs too much research and development in-house and would provide greater stimulus to national industrial growth by contracting with industry for more of its needs. It is alleged that the National Research Council with its propensity for basic research has failed to make significant progress in fostering product oriented research and development in industry just as the research incentive programs of the Department of Industry Trade and Commerce have failed to produce technological innovation. The expansion and proliferation of government laboratories have duplicated in some important areas established industrial capabilities and have furthermore inhibited the flow of technological information to the public sector. The Special Senate Committee on Science Policy and the Air Industries Association of Canada have put strong pressure upon the government to act to restrict its in-house research programs. Recently the government has acceded to this pressure (May 1972) and has promulgated a policy through which its requirements for research and development are to be contracted out wherever possible." (5)

From the United States, Dr Alan Berman, Director of Research at the Naval Research Laboratory said in a recent report that

"We at NRL have continued to work closely with our colleagues in academia and in industry Our tradition of working with industrial groups, who must eventually supply the hardware and other devices which will be used by the Navy, allows us to assist the transfer of nascent technology from basic-research

laboratories to industrial development groups." (8)

Some details of the current U.S. Department of Defense budget for research, development, test and evaluation are worthwhile looking at to see the scale on which industry carries out government research and development there.

United States Department of Defense
Budget for Research, Development, Test & Evaluation
for Fiscal Year 1978⁽⁹⁾

<u>Category</u>	<u>\$ millions</u>	<u>%</u>
Research	419.7	3.5
Exploratory Development	1,460.1	12.1
Advanced Development	2,296.7	19.1
Engineering Development	4,872.5	40.4
Management and Support	1,410.1	11.7
Operating and Systems Development	1,584.5	13.2
	<u>12,043.6</u>	<u>100.0</u>
<u>Performer</u>	<u>\$ millions</u>	<u>%</u>
Industry	8,483.3	70.5
Government In-House	3,011.1	25.0
Federal Contract Research Centers	209.9	1.7
Universities	339.3	2.8
	<u>12,043.6</u>	<u>100.0</u>

In the comments on the program, it is said that

"At the same time, we are proceeding toward an objective of restoring the ratio of in-house to contract R & D to the lower and better balanced ratios which existed in the early 1960s Industrial independent research and development is absolutely central to the quality of defense RDT & E it results in lowering the cost of acquisition and it is a uniquely efficient source for new technology and the innovative new options of (the technology base) It pays for itself many times over." (9)

It should be noted that, although over 70% of U.S. defence research and development is already being carried out in industry, it is intended to increase this even further to achieve a better balance.

This research and development in industry is, of course, spread across all industry, large and small. However, small industry can and does carry out research and development particularly in specialised areas such as applied electronics. Also creative scientists are often happier away from the large corporation. Increasing the proportion of government research and development in industry therefore increases the opportunities for small firms and makes possible a more rapid technology transfer into small firms.

In a paper presented in 1975 to a conference on Conserving Resources, Mr E.E. Pernase analysed the 1969 total research budgets of various countries into four groups - industry, Government, higher education and private non-profit. (These groups may be compared with those given in the above table under the heading 'performer'). His data are repeated in the figure on the next page. He comments

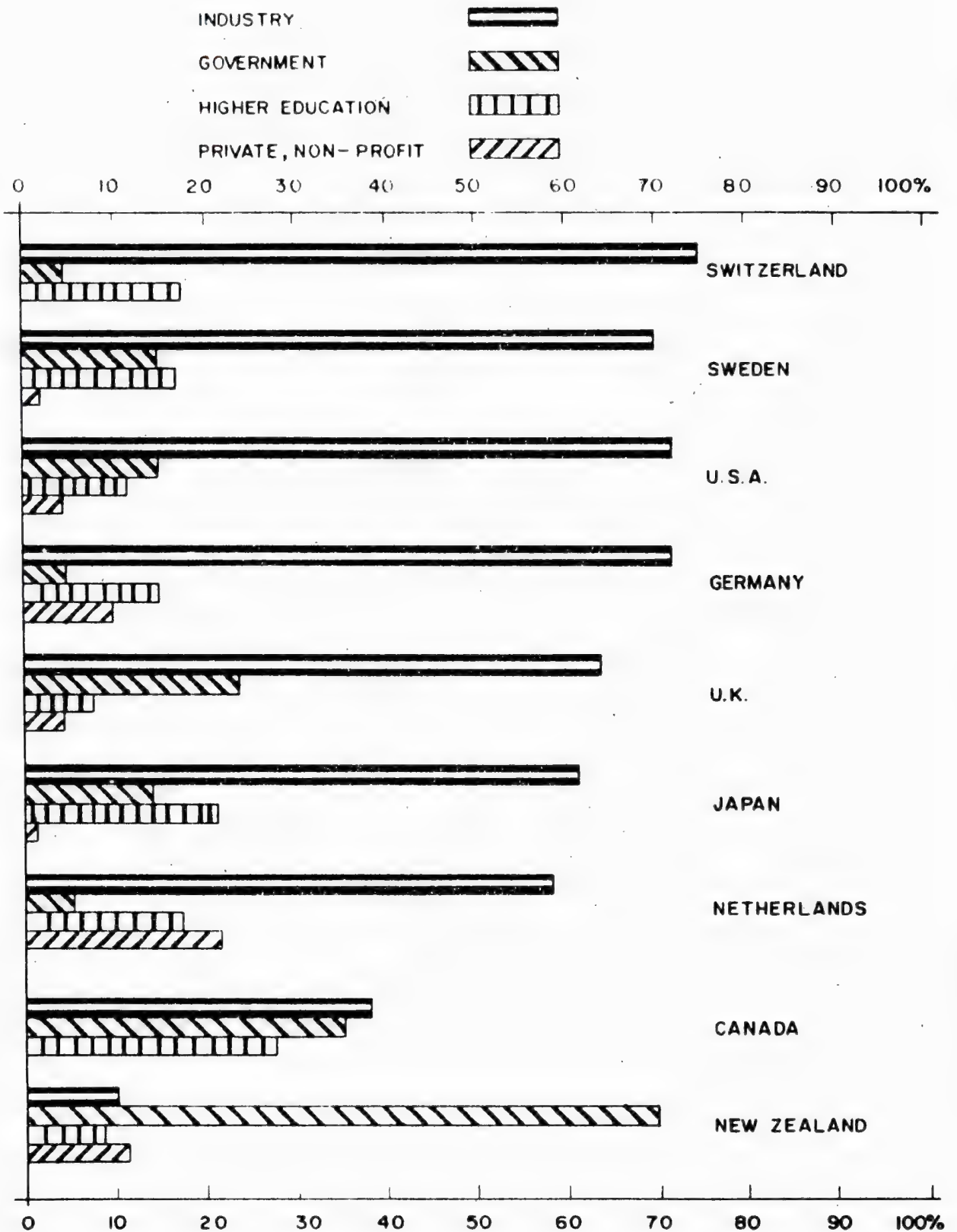
"The comparison shows that the bulk of research is concentrated within industry in industrially advanced countries. New Zealand is the odd man out. There is no substitute for 'in-house' applied research and development. Study and action, research and application, theory and implementation are reciprocating and regenerative. Clearly, more research and development should be centred in New Zealand industry." (10)
(in-house here refers to within industry)

The Task Force under Sir Frank Holmes commented in the same way, suggesting diversity in funding avenues for research and noting that it could be desirable to see less research work concentrated in departments and much more Government financed research contracted out to universities and industrial companies. (6)

Some progress has been made by Government in encouraging industry research. A recent survey of the situation and comments on some of the problems in carrying out R and D in small firms has been made by Dr M.C. Probine, Asst Director General, DSIR. (12) He states that small companies can successfully involve themselves in research and development and notes that some of the most successful product innovations of this century have come from relatively small companies.

However, more rapid progress on transferring research and development from Government laboratories to industry should be possible and would be beneficial to small firms (as well as to large). The role of the National Research





ANALYSIS OF ALL RESEARCH EXPENDITURE IN 1969

FROM E.E.PERNASE, APPLICATION OF RESEARCH AND DEVELOPMENT
IN NEW ZEALAND'S SECOND GENERATION INDUSTRIALISATION

1. Name

2. Address

3. City

4. State

5. Zip

6. Telephone Number

7. E-mail Address

8. Date of Birth

9. Sex

10. Marital Status

11. Education

12. Occupation

13. Signature

14. Date

Advisory Council already includes advising the Minister of Science and Technology on "the association of Government with industry in the promotion of fundamental and applied research, including the promotion of research associations."⁽¹¹⁾ and other Government agencies exist to implement this policy. With continuing Government assistance, the way is clear for the proportion of research and development in local industry to be increased.

Research and development are, of course, expensive as the costs of equipment and other facilities are high. It is, therefore, often more practicable for small firms to carry out research and development in cooperation with other firms. This is why the Department of Scientific and Industrial Research assists industry in setting up research associations⁽¹²⁾ which now receive about one-twelfth of the total expenditure of DSIR as grant aid.

Government Purchasing

Much has been written on the potential for positive use of a government's buying power. The U.K. Bolton Report⁽⁴⁾ stated that there was scope for the deliberate use of this power to foster enterprise and innovation among small firms. The Committee found that Government purchasing power was very important in many fields suitable to small business - for example, drugs, food, clothing, printing services and building services are but a few of the items that small industry could supply as well as large. It was seen that a deliberate policy of discrimination in favour of - or against - small suppliers could have the most dramatic effect on the prosperity of the sector. In fact no such policy existed.

Normal government purchasing practices using competitive tenders work against small firms which usually do not have the demonstrated ability to carry out work which a large firm is known to be capable of. Often, small firms are not known well enough to be on the approved list of suppliers when 'selective' tenders are being called. Sometimes large firms are thought to be more efficient suppliers and so are favoured but small firms, given a fair chance, can often match or surpass the large firm in its capacity for efficient supply. The Bolton Report therefore recommended that the Small Firms Division of the Department of Trade and Industry should promote official policies designed to maximise competitive participation by small firms in suitable Government contracts.

In the United States, the Small Business Act of 1953 stated:

"It is the declared policy of the Congress that the Government



should insure that a fair proportion of the total purchases and contracts or sub-contracts for property and services for the Government be placed with small business enterprises."

By 1971, about 20 per cent. by value of U.S. Government prime contracts went to small firms. In addition, prime contractors of large contracts are required to give small specialist sub-contractors a chance to participate.⁽⁴⁾

Dr Probine has written on this subject⁽¹³⁾ and has shown some of the factors that have to be considered. As there is no doubt that much more could be done along these lines, the matter will be discussed in more detail shortly.

Defence Purchasing

The United States policy of buying their defence equipment and material from their own industry is well known but their industry and defence purchasing are both on such a vast scale that any comparisons would not be helpful for us. The attitudes of Canada and Australia, on the other hand, are likely to be instructive.

In both these countries, as in New Zealand, it is recognised that most major items of defence equipment will always have to come from external sources. However, there remains a considerable part of the defence shopping list which could be met by local industry but, to be effective, there must be firm Government direction and a changed attitude within defence purchasing organisations.

In Canada, the Government in recent years has been reflecting a stronger national and domestic emphasis and this must affect defence policy. Military aspects of international alliances are having to be given less emphasis relative to a broad range of domestic issues. Those concerned with Defence purchasing have not been used to giving any special attention to national goals such as economic growth and stimulation of technological innovation. Factors such as price, standardisation with allies and high levels of operational effectiveness in sophisticated weapon systems have been dominant considerations. Some of these may now have to assume relatively less importance than such factors as where the equipment is manufactured and how versatile it is in performing a variety of more simple tasks.⁽⁵⁾

The Australian position on defence purchasing and local industry can be seen more precisely for it is discussed in some detail in a recent White Paper on



defence.⁽¹⁴⁾ The Paper says that Australia will continue to rely on overseas sources for the design and construction of most of the larger and more complex weapon systems, but, on the other hand, much was being done using local industrial sources to reduce their dependence on overseas sources for the continued maintenance of this equipment. The Paper continues:

"The central objective of Defence industrial policy is thus to ensure that the Defence Force can be supported and maintained in Australia, utilising for the provision of equipment and material, a combination of local industry, selective stock-holding and reliable overseas sources of supply"

"Industry activities thus generated include the establishment and maintenance of the capability to repair, maintain, modify and adapt to the Australian environment a wide range of equipment and weapons systems of the forces, and to manufacture high volume consumable and minor equipment items such as spare parts, ammunition, clothing, and personal and field communications equipment"

"Implicit in these activities is a basic design and development capability which will permit selective local design and development of equipment, modifications and adaptations to overseas designs, as well as production"

"Specialised industrial support for the Defence Force within Australia is provided from Government factories and dockyards, private industry concentrating on defence work, and Service facilities. At the same time, production facilities in private industry, established and maintained for commercial reasons, provide the bulk of defence requirements of a less complex nature and can be expected to continue to do so."

"Defence expenditure on industry facilities for production of equipment and materiel, and for support of locally manufactured and imported items, is concentrated on specific facilities and technologies not required or not economically viable for commercial reasons. The majority of this expenditure is in the aircraft, munitions, naval ship modernisation, refit and construction, and electronic industries."



The White Paper stated that, over the last five years, some 60-70 per cent. of Defence expenditure on the aggregate of votes covering new and replacement equipment, purchase of stores and repairs and overhaul of equipment, has been placed in Australian industry. It said that the means available for the fostering of defence industrial capability were generally:

- "a. through selectively directing Defence procurement in whole or in part into Australian industry and accepting any higher costs and delays that may be legitimately incurred;
- b. by funding separately feasibility and project definition studies and the establishment costs of local production and/or support facilities;
- c. by facilitating the obtaining of offset work, on a competitive basis, in similar technologies through the insistence on such provisions in procurement arrangements;
- and
- d. through local development of equipment and systems either in industry or in Defence establishments with subsequent production in industry or government factories."

In New Zealand, the policy that wherever practicable Defence purchasing should favour local industry has been affirmed for a long time. In 1973, the Chief of Defence Staff, Air Marshal R.B. Bolt (then Asst Chief of Defence Staff), in addressing the Defence Production Seminar, was reported as follows:

"... our inevitable continuing dependence on allied sources for certain major military equipments was emphasized. Nevertheless there was very considerable scope for New Zealand industry to play a significantly greater part in the field of maintenance stores and supplies of many kinds, providing certain conditions could be met. Similarly, within our special understandings with Australia the potential opportunity to meet Australian Defence requirements was also possible to a greater degree. Perhaps the most difficult problem in progressing these ideas was that of developing a working dialogue between Defence interests and potential industrial producers."(15)

Reference was made to special efforts being made in the Ministry of Defence to overcome this problem and to identify appropriate stores requirements that might be met by New Zealand industry. An effort was also being made to see

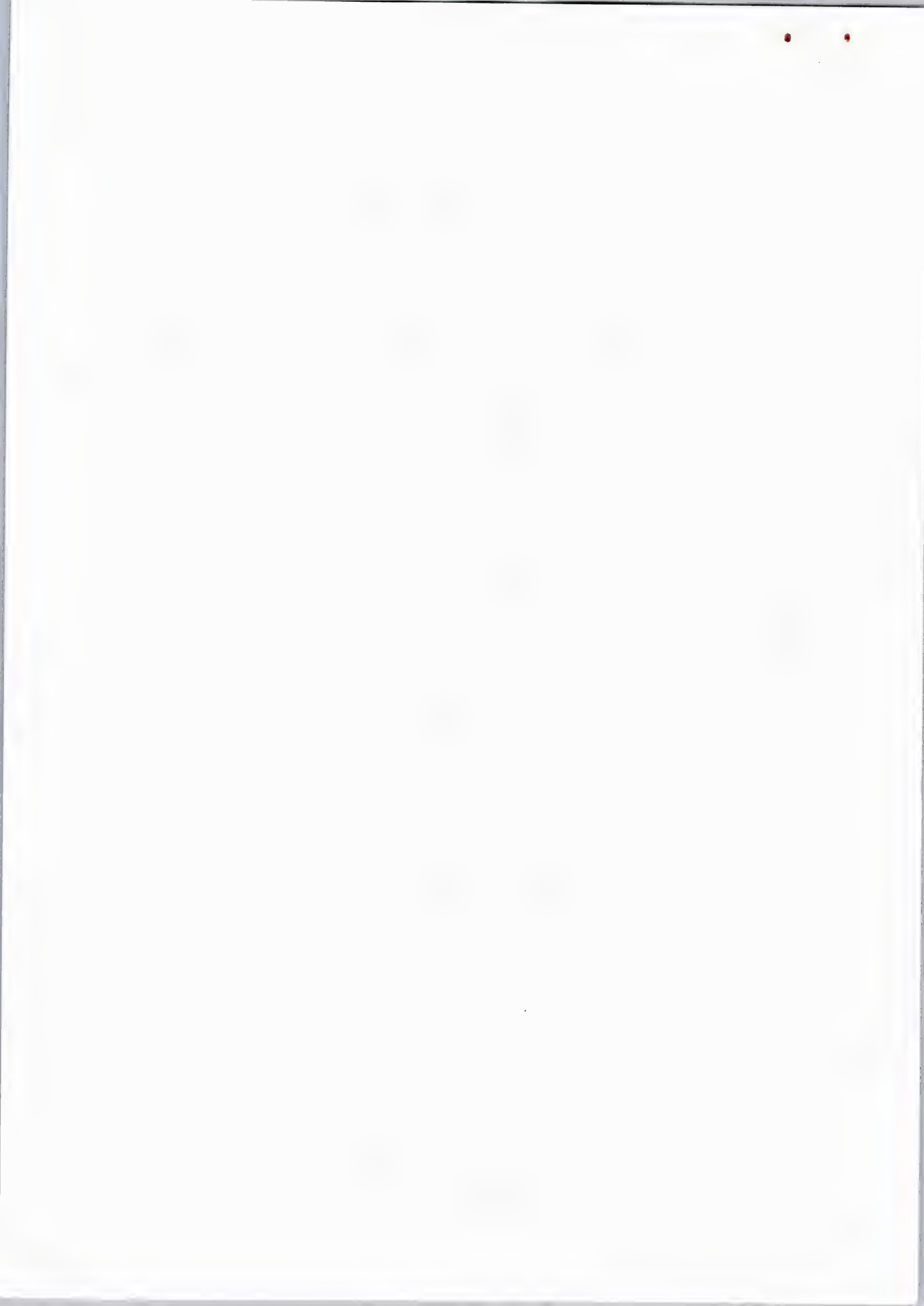


what New Zealand could produce for the Australian Services. Air Marshal Bolt laid stress on the high standards that were required by modern military specifications and pointed out that the whole field of quality assurance and inspection of local products required much greater attention.

In spite of the Government's desire to increase the proportion of defence purchases from New Zealand industry and a willingness at least among top management within the Defence Department for this to happen, progress has been very slow. There appears to be no real incentive for purchasing officers to try to buy a local product. Government policy is not very strong or consistent on this subject and clear, firm, directives in favour of local industry have not been promulgated. At present, except for some small items, it is almost always more difficult to acquire the local product than one from overseas. More attention must usually be paid to specifications and testing, especially if the local product is to come from a small firm. Allowable price margins (if any) between the local and overseas products are not clearly defined but any margin paid above the best competitive price is a further loading on the limited funds available for defence purchasing. Very often, only lip-service (if that) is given within the Defence Department to the matter of purchasing from local industry.

Earlier, it was stated that, in Australia, some 60-70 per cent. of the total defence expenditure on equipment, stores and maintenance was now placed in local industry there. Figures to allow a direct comparison for New Zealand defence purchasing are not available as our accounts are kept in a different way. However, the Assistant Secretary of Defence (Finance) has informed me that, over the last five years, the percentage of New Zealand defence expenditure on equipment, stores, services and maintenance paid in New Zealand currency has risen slowly from 52% to 55%. For comparison with the Australian figure for local industry, this would have to be reduced considerably. Expenditure in New Zealand currency includes commission paid locally for overseas orders, purchase of overseas items ex stock from New Zealand agents, services (e.g. electricity), works and some other items not included in the Australian figures. Allowing for these, the comparable New Zealand figure works out to be about 35%.

The proportion of local industry expenditure in Australia is expected to rise. However, if we used their present proportion as a goal to which we might aspire, we could, potentially, place another \$25,000,000 annually of defence purchasing with local industry instead of overseas. This assumes, though, that we could increase our local industry capability to that of



Australia. This is unlikely but we could probably achieve at least \$10,000,000 increase in local purchases and this could be further increased by offset arrangements. (Note that these figures include overseas payments for components imported by local manufacturers and included in products bought locally).

Bearing in mind that all the larger, more complex defence equipment purchases would continue to come from overseas, most of this potential for local industry is for smaller items. Small firms could be expected to be able to supply a large part of it provided that they could meet the fairly stringent requirements for defence equipment. One way in which their capability could be increased is through repair and maintenance of defence equipment. Giving local firms progressively more of this type of work as they became more competent will not only put such work where it ought to be - in industry - but will also lead to an increase in their manufacturing skills.

Government has a clear-cut role in increasing the proportion of defence purchasing with local industry. To be successful, it must:

- . a. ensure that selected local firms (most of which will be small) build up their capability through Government-sponsored research and development or selected prototype development;
- . b. give firm and unequivocal direction that local purchasing is to be increased progressively;
- . c. accept the extra time and cost that this will incur initially and provide for this by adding extra finance to the Department's normal estimates;
- . d. place increasing amounts of repair and maintenance work with local industry;
- . e. strengthen the defence local production teams in the Ministry of Defence and Department of Trade and Industry in both numbers and authority to ensure that the directions are carried out;
- . f. provide for a small production design and development team within Ministry of Defence to assist local industry to provide what Defence needs;
- . g. make it easy to buy from local industry and hard to buy from overseas in contrast to the present position.

Given such a policy, the local firms must ensure that their products are comparable in quality with those available from overseas. They must meet appropriate specification standards, have adequate documentation on operation,

performance and reliability, provide an efficient back-up service for the solution of any problems encountered in use and carry an adequate supply of spare parts over the life of the equipment. Unless firms meet this challenge, they will merely confirm the poor opinions held on their capabilities by many staff in Government departments and invite pressure for the cancellation of such special measures for their support as are now being discussed.

This subject will be discussed further in a later section of the paper.

Taxation

Company Tax. The Bolton Committee⁽⁴⁾ found that in England, most small businesses felt that tax was a burden. They noted that, in the United States, small firms were given preferential tax treatment, being able to choose a tax structure to suit their business and getting the first \$25,000 of taxable income at a reduced rate. However, it was considered that, for England, the U.S. system would not be good. It would lead to tax avoidance through company splitting or by closing down and reforming and would remove any incentive to grow. However, they did state that a taxation policy which would restore initiative, encourage "entrepreneurial" activity and improve the liquidity position of small businesses was needed.

Mr Len Stanners believes (following many discussions with small firms) that making the first \$10,000 assessable income free of tax for small companies would have a dramatic effect on their growth and that any loss of tax would be quickly balanced by increased growth bringing new direct taxes (personal communication). This could be so, but it would still be open to the objections found by the Bolton Committee. On the latest figures available (for 1971/72)⁽²⁾, this exemption would cost over \$25 million - that is, nearly one-tenth of the total company tax. On the other hand, it would not cost too much and would give a significant boost to small businesses if such a tax concession were given to selected firms only (see page 37).

Sales Tax. Several complaints have been noted in respect of sales tax and small firms. One problem, for firms recovering sales tax on components in products being exported, is to find the finance to carry the tax during the manufacturing period. It has been stated that although the tax is collected quickly enough, the recovery of the cash is often slow and this makes the liquidity problem worse. Another concern is that a large number of manufacturers now have to register as wholesalers under new regulations. This leads to the need to cope with inspectors, more bookkeeping and internal audits, all of which the busy owner/manager of the small firm usually has to

deal with himself. The Government could assist small firms by re-examining these matters and finding some way to eliminate the problems in the interest of increased productivity in local industry.

Import Deposit Scheme. In the same way, the import deposit scheme ties up capital needed for company development. Also, as mentioned in the introductory paper at this workshop, the tax is not applied in a common-sense way. Accepting the administrative difficulties involved, surely some way could be found to cover the deposit with a bond until the material was exported and so avoid reducing the company's progress. The scheme may be designed to maintain restraint in the economy, but it is also placing a hurdle in the way of those small firms which are trying to increase their efficiency and output.

Bonus Shares. Small firms often have difficulty in borrowing and one of the reasons is that the size of their registered capital is small. There is, therefore, some pressure to transfer retained profits into bonus shares and so make borrowing easier. Apart from the bureaucratic delays that have been met in seeking approval for this, the bonus share issue will be taxed at 17.5% and so remove this amount of working capital from the company. The result is a reluctance to take this step if it can be avoided, thus inhibiting growth. Government could well encourage small firms by removing the tax on bonus issue shares.

Machinery Tax. This has the same effect as the import deposit scheme and sales tax (for exporting firms) in reducing the rate of growth of small firms. It is pleasing to see that the Budget includes provision for removing this tax for high growth firms.

Finance

Finance will be discussed in another session but must be mentioned here as, in New Zealand, it is likely that only Government could assist in the provision of venture capital. The Development Finance Corporation is, I believe, supposed to be of assistance in this but the experience of small firms in the high-technology area is that the DFC won't take risks. I have reason to believe that the opinion of these small firms is right and that pressure must be placed on the DFC to accept that many projects are a calculated risk and that financial returns will take several years. However, although some may fail, the profit from those that don't could be very great indeed. The provision of venture capital is an essential factor in fostering small firms.



IV OTHER PROBLEMS OF SMALL FIRMS

In this section, several other problems of small firms will be mentioned. Some of these will be dealt with in other sessions of the workshop but are referred to here as they are matters which the Government can help in resolving.

Growth Rate

The growth rate of small firms has been studied often. For a small firm, some growth is essential for it to survive and the factors inhibiting growth must therefore be recognised and countered. They seem to be the same everywhere.

Finance is the problem most often reported. Nearly half of the New Zealand companies replying to a questionnaire sent out by the Department of Trade and Industry for the Electronics Advisory Council specified non-availability of finance as a significant factor.⁽¹⁶⁾ Newly-formed firms usually depend initially on their own savings and those of relatives and friends. There is often an underestimate of the capital required and insufficient business management capability to know how to get more. In England, it was found that fast growth was associated with success in external borrowing, but it was not clear if firms were fast growers because they raised outside finance or if they could borrow easily because of their demonstrated ability to grow.⁽⁴⁾

Other factors limiting growth that have been noted include insufficient Government purchasing, high sales tax, import licensing problems (with 3 years of special licences before a basic licence is given), shortage of components, absence of planning, lack of skilled staff, limited domestic market and lack of necessary plant. A shortage of ideas has often been mentioned. For high-technology industries, it has been found that an essential condition for growth is the presence of an "incubator" industry - that is, an already successful high technology firm, university or government laboratory from which new firms "spin off" with product and process innovations.⁽⁵⁾ However, there is often a stubborn resistance on the part of inventors and newly-formed but financially-insecure firms to give up any equity in their invention in return for the necessary capital to develop that invention. (Local examples could be given of both these factors working for and against small firms).

All of these problems affecting growth could be helped by Government intervention. Finance will be discussed in another session but some of the other factors could be reduced by the provision of advice to small firms. This should be available from the new Small Business Agency.

Excessive Paper Work

Small firms everywhere are bogged down in paperwork. There are official forms of many types: statistical returns which need a considerable amount of research to fill in properly and which often require information already given to another Government department, administrative forms - tax, import licences and the like - involving satisfying many Government departments (all of whom must have their form on the laid down date irrespective of the pressure of productive work) as well as the normal business paper work of orders and accounts (and submissions to the bank for more finance to pay for a clerk to cope with it all). Usually the owner/manager of the small firm has to do all this paper work himself and it absorbs a very significant part of his total available time.

Government could help by introducing more standard documentation. For instance, it is understood that the Distribution Council of the NDC was working on the provision of standard documentation for freight movement in New Zealand but, as far as I know, nothing has come of this yet. Also, perhaps the Small Business Agency could produce pamphlets telling small-firm managers which forms to fill in for the various official requirements (customs, import licensing, etc.) and how to do it correctly.

Capital Equipment Pool

Lack of necessary plant or special equipment often frustrates small firms. During the last war, the Government assisted firms in getting capital equipment needed for war production. Overseas this is commonly still done. In New Zealand, it is easy to hire a concrete mixer but very difficult to find someone with, say, a special-purpose oscilloscope for hire. Yet, most small firms have an intermittent requirement for some unusual machine or piece of special test equipment which they cannot sensibly buy. With Government assistance, a hire pool of this type of equipment could be maintained with consequent improvement of the capabilities of small firms.

Weak Technology Base

The need for strengthening the technology base in small industry is commonly felt but this, involving training, consultancy, possible interchange of staff between small firms and development laboratories and other ways of technology transfer forms part of other sessions during the workshop. In this area, more needs to be done and Government can play a bigger role. However, unless the basic structure of the firm is sound, Government support will be wasted. Such support should therefore go only to selected firms.



V GOVERNMENT PURCHASING

Its Potential for Inducing Growth

Government purchasing is such an important and potentially powerful tool for aiding industrial development that it warrants looking at in more detail. In section III it was shown how Government purchasing could have a powerful impact on the growth of local industry (small and large scale) if it was used wisely. Defence is only one section of Government that could contribute in this direction. Close attention must also be paid to the pattern of purchasing by other sections such as the Post Office, Works and Development, Railways, and Electricity Department. Government-supported organisations such as Air New Zealand, National Airways Corporation, hospital boards and local bodies should also be looked at to see how more of their funds could be spent to support local industry.

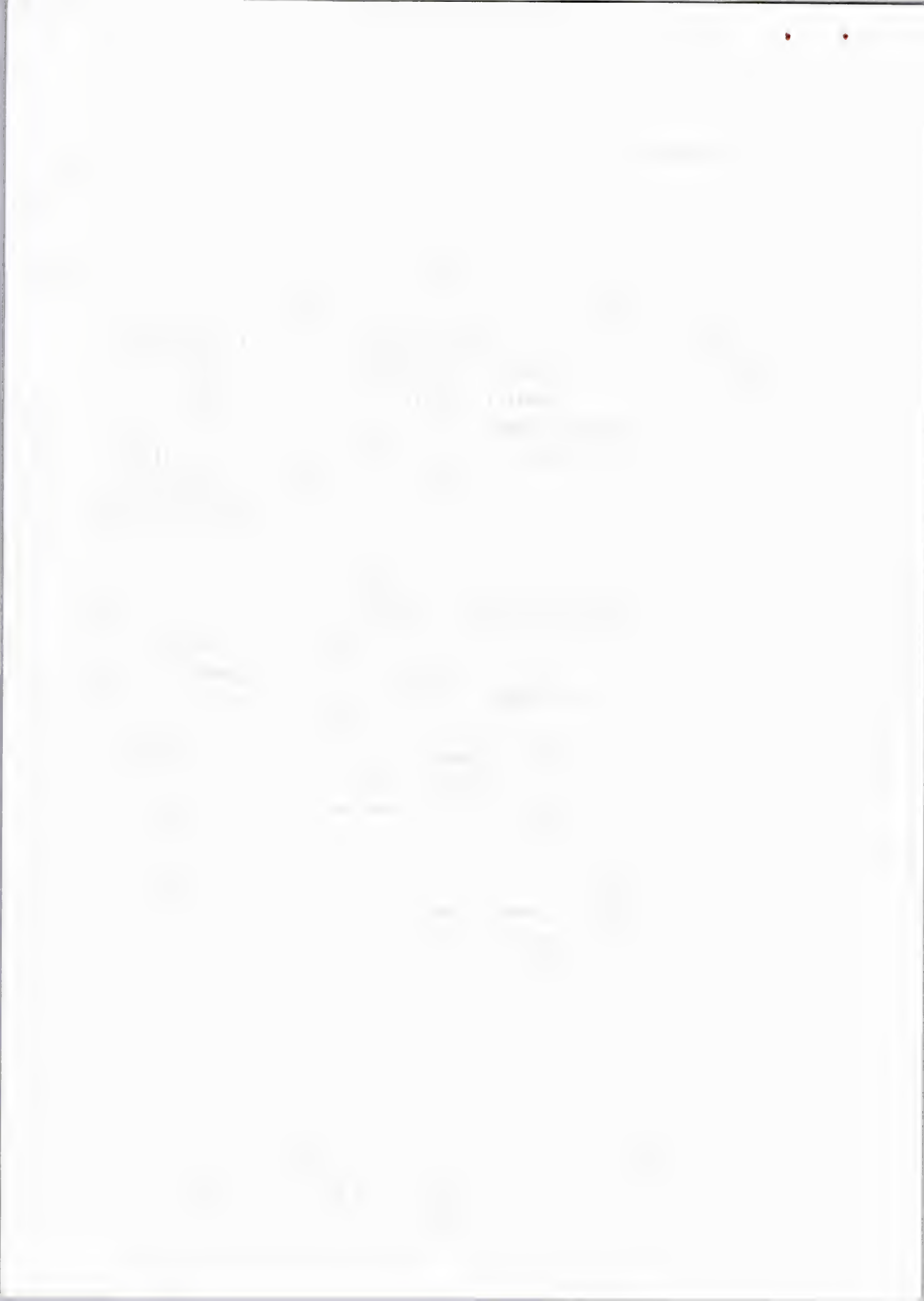
To achieve progress in this way, the Government must strengthen the regulations on local purchasing so that the Government's intention is seen to be serious - and not just a desirable idea of which little notice need be taken. Procedures will have to be introduced to ensure that positive action is taken to buy from local industry whenever practicable. But for this to be successful, industry - and particularly small industry - must learn to play its part. It is not reasonable to expect the local product to be acceptable unless its quality is similar to that from overseas. Large industry can usually (because of their overseas associations) maintain a good standard but small industry has, as yet, much to learn.

For both small industry and Government, therefore, a change in outlook is needed so that with better communication and a new willingness and some really hard work, local industry can grow strongly. I believe the initiative lies with Government but small industry must be ready to do its part.

Pre-production Orders

With the aim of encouraging new technological development and domestic production of goods previously imported, the National Development Conference recommended that:

"The Government endorse the principle of pre-production orders, and take such steps as may be necessary to enable this method of industrial assistance to be used."⁽¹⁷⁾



Pre-production orders make provision for exemption from the normal Government requirement that stores must be purchased by competitive quotation, and permit a department requiring a particular product to place an order with a selected New Zealand manufacturer provided that certain criteria are met. These criteria are set out in instruction 10-4 of the Government Stores Board (G.S.B.) Instructions which was issued in November 1970. At the same time, revised instructions for handling prototype contracts and development work were issued by G.S.B.

For the information of industry, these instructions were printed in an issue of Industrial Development.⁽¹⁸⁾ A copy of that article is given for reference in appendix 1.

The policy given in the instructions is good but the regulations that follow ensure that the policy will be ineffective. They are far too ponderous and restrictive and give little incentive to industry (particularly small industry) to become involved with Government work. The Electronics Advisory Committee gave considerable time to discussing these rules and making some recommendations to G.S.B. but only two very small changes were accepted. These are shown in appendix 1.

Let us look at some of the reasons why these regulations are not effective for fostering local industry:

- . 10-2.(2)(a) Production of a specification and drawings of a prototype by one firm will not be suitable for production by another;
- . 10-2.(2)(b) Some firms are frightened that their original work under a development contract might be patented by Government;
- . 10-2.(3)(b) This is exactly opposite to what it should be. Instead of being told that they will not be entitled to special consideration, firms should be told that, "in order to foster local industry, they will be given special consideration or protection" Manufacturers are reluctant to release the results of their development work to their competitors. As it stands, therefore, this clause removes the incentive for firms to accept development work from Government.



- . 10-2.(4) One way, particularly for small firms, to improve their technology base is for them to develop (in consultation with Government laboratory staff) ideas that might be useful. Clearly, the Government is under no obligation to accept any resulting equipment but the clause removes the informality with which this type of technology transfer should take place.
- . 10-3. As originally written, this clause excluded drawings, specifications or a prototype arising from development work. With the modification following the submissions by the Electronics Advisory Committee, the clause is more reasonable. However, as 10-3 also includes 10-2, (3) and (4), the comments given above under these clauses still apply.
- . 10-4. The rules for pre-production orders do little to help local industry. The main argument is with section 10-4(3) and (4). Incredibly, it may require dealings with four Government departments or organisations before approval is obtained for an order to be placed! The factors in 10-4(3) seem to be designed to stop the use of pre-production orders instead of to foster industry. For this type of order to be appropriate, the only requirement in 10-4(3) should be "in the national interest". Use in industry and export potential are irrelevant - the item might be for Defence or the Post Office only, or an import substitute. Industry investment and risk are irrelevant also. The aim is to foster the industry and this does not necessarily involve any risk, particularly if the firm has built a prototype. The note on prices is completely wrong in concept. It will usually be necessary and right to pay much more for a local product than for a comparable overseas one to foster local industry in the early stages of production of a new product.

A major purpose of these regulations is to foster local industry. To be successful in this the rules should state that:

- . the first approach to industry for development, construction of a prototype or pre-production orders for a new product should be an advertisement asking interested firms to register;
- . all these interested firms should be considered before selection of the best able to carry out the particular project;



- . subject to satisfactory performance, the selected firm will be given preferential treatment in considering later purchases arising from its development work or prototype contracts.

If it is desired to maintain competitiveness to a late stage in the process, the U.S. system of parallel development can be used. This is much more economic and efficient than expecting one firm to pick up where another has left off, particularly following development work. I have seen a number of examples of this and they have almost all been failures. An American comment may be helpful:

"In addition to limited competition at the beginning of a program, there is almost no hope of obtaining competition or changing sources once a source is selected and the program is under way. The selected source very quickly acquires people and experience - and the government acquires a sunk cost (both money and time) in the people, the experience, tools and equipment - that effectively precludes changing sources. One observer described this situation vividly:

Buyer and seller are locked together in a relationship analogous to bilateral monopoly for the life of the program, and they must deal with each other on a bargaining basis.

This locking together of the contractor and the Service highlights a major difference between the traditional and weapon system markets."⁽¹⁹⁾

From the point of view of both industry and Government departments who have to operate under the rules, a major change is needed before development work, prototype contracts and pre-production orders will have any real effect in sponsoring local industry, large or small.

Testing and Field Trials

Before it can be accepted for use by a Government department, particularly for use in rigorous conditions, a product of local industry must be tested to check that it meets its specifications and then given field trials. Large industry may have its own test facilities but small scale industry will have to make use of a private or government testing laboratory registered under TELARC or



qualified in some other way to issue test certificates. However, formal testing should be done with common sense - it doesn't matter if a specification is not met if it is too tight for the particular circumstances.

Following testing, a new product will need field trials. Here, the loving care lavished upon the product by its maker will be replaced by a much harsher environment. The standard met by good quality commercial equipment will often suffice for controlled military environments (such as within permanent buildings or temperature controlled aircraft). However, for many military uses and for other outside uses - for boats, some Post Office requirements and the like - full field tests under actual conditions will be necessary. A useful description of what is to be expected was given in 1933 by a practical field worker. An extract from this paper is given in appendix 2.

Specifications

Great care must be taken to ensure that specifications suit the need. Some people think that the requirements should be set beyond what is reasonable in order to push the state-of-the-art to obtain the maximum possible standard. If this technique does get anywhere it will certainly be at very high cost and the resulting product is likely to be more sophisticated than necessary. Often unattainable goals of reliability and maintainability are specified at the outset as if these were independent of the, as yet, incomplete design.

With small firms, this process is useless. On a number of occasions, I have seen specifications of this type returned without any quotation. The standard is obviously too high for them. Yet, the specification is often not able to be met by large overseas suppliers but, because of some strange reasoning leading to the conclusion that the overseas product must be all right, that product is ordered. There is a double standard which we have to eliminate - the local product is expected to be better than that from overseas for the same purpose.

The specification, especially for new or complex products, should be negotiable in its details. It is unsound reasoning to believe that a satisfactory specification can be written without considering the means by which it can be met. For defence use in particular, good informal communications between the selected contractor and the customer are essential. Some flexibility is necessary as the contract progresses to allow for changes in technology or military threat.



However, once the job is under way, variations to the specifications should not be introduced lightly. Some American advice puts it this way:

- . Let a good thing alone.
- . What looks like a pussy cat may turn into a tiger. (19)

In other words, if it already works well enough, let it be. What appears to be only a small change may lead to others with consequent escalation in cost and time.

Tenders

If the specification is reasonable, there is a greater chance of local industry, particularly small firms, being able to tender. There is still a need for consultation, though, in order to show the small local firm manager what is meant by a complicated invitation to tender. It might only mean - as he would see if he had the time to study it thoroughly - that what was wanted was no more than his current standard. To support local industry extra time may need to be given the small firm to prepare tenders. There is also, perhaps, a case for compensating selected small firms for the time spent on this.

When it comes to considering tenders, a conscious effort must be made to get the product from local industry, if this is practicable. At present, it is easy to bypass local industry. Extra time and cost (within reason) should not be an allowable excuse for not getting the local product. Insufficient technical knowledge should not be accepted either, unless it is impossible for the firm to be given this from Government establishments. There is a widespread prejudice against the local product which is not always justified.

Mr Len Stanners has told me (personal communication) that he had found that Australian Government departments provided help to their local industry at company level by accepting, not necessarily the lowest tender, but the lowest suitable one that could assist their industry. Before reaching a decision, they inspected most likely firms, looking at their capability and competence, finance, suitability of space and equipment, management strengths, quality control and other factors. They helped firms by providing expertise to overcome technical shortcomings, lent equipment (for example, to set up a quality assurance program) and seconded Government staff to the factory if necessary for a period.

The Australians are taking this seriously. During the last war, we did



too, providing assistance to industry along the lines that the Australians are doing. We were then strongly motivated to upgrade industry and had some noticeable successes, but after the war (in contrast to many other countries) we gave it all away. It is now time to get going again.

On the other hand, we must not underrate the work that must be done to foster industry. We must temper the optimism of a firm, eager to get a Government contract, with scepticism about their capability, at least until they have been "checked out". The Electronics Advisory Committee found that contracts had been placed on local firms simply because they were the cheapest tenderer without any check on their capability or plant.⁽¹⁶⁾ Such practices are likely to lead to disaster for small firms and can only give local industry a bad name when it does not come up to expectations.

Offsets

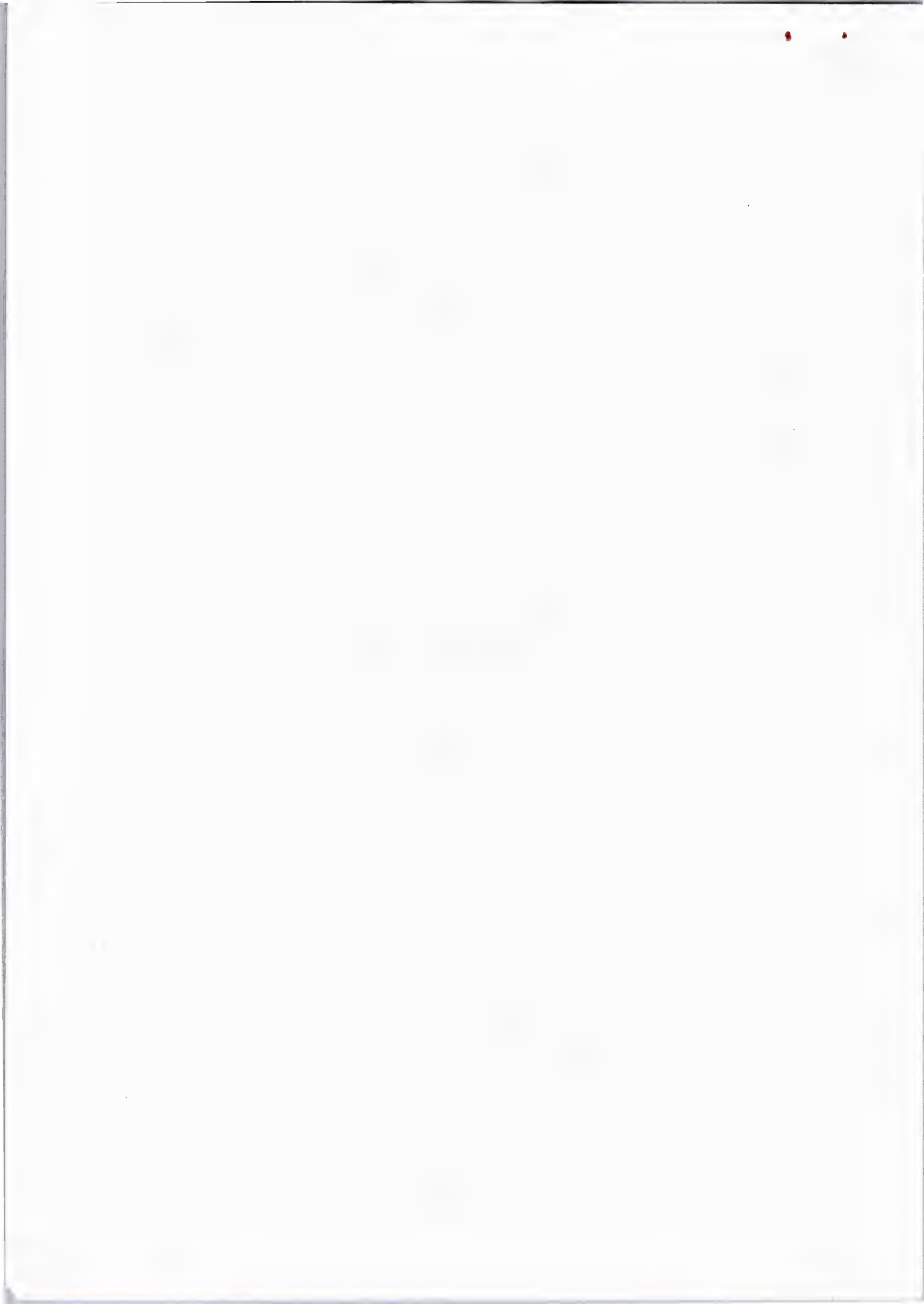
Offset orders could help a lot in fostering local industry and probably small firms especially.

Mr D.H. Eltringham, the Deputy Secretary of the Australian Department of Defence has recently explained the Australian position on offsets in relation to defence purchases.⁽²⁰⁾ Offsets form one category of the Australian Industry Participation program.

"Under the offsets policy, which applies to all major purchases from overseas sources by Government departments and instrumentalities, overseas tenderers are required to submit proposals for offset work to be placed in Australian industry to a target level of at least 30% of the contract price. Offsets may include part production of the equipment being purchased, co-production arrangements to satisfy larger markets, or the reciprocal purchase of goods and services of Australian origin

"It is our objective to negotiate firm offset arrangements for inclusion in every contract with an overseas supplier. Where it has not been possible to conclude the definition and costing of all offsets at the time of entering a contract, the contractor is required to enter a firm commitment to continue to seek offsets from Australian sources up to the 30% target figure."

Mr Eltringham said that under the offsets arrangement, work for Australian industry was expected to be placed in areas of technology associated with the



equipment being purchased in order to strengthen Australian industry. He said that, over the last five years, work to the value of \$132 million has been contracted to Australian industry through the offsets policy.

We should be doing the same to foster the growth of our industry. I understand that the matter is being looked at at present and that an aim for offsets of 25% on all Government purchases might be required soon. I hope so, for this would give a strong boost to our local industry and open the way for small firms to be more involved in Government purchasing.

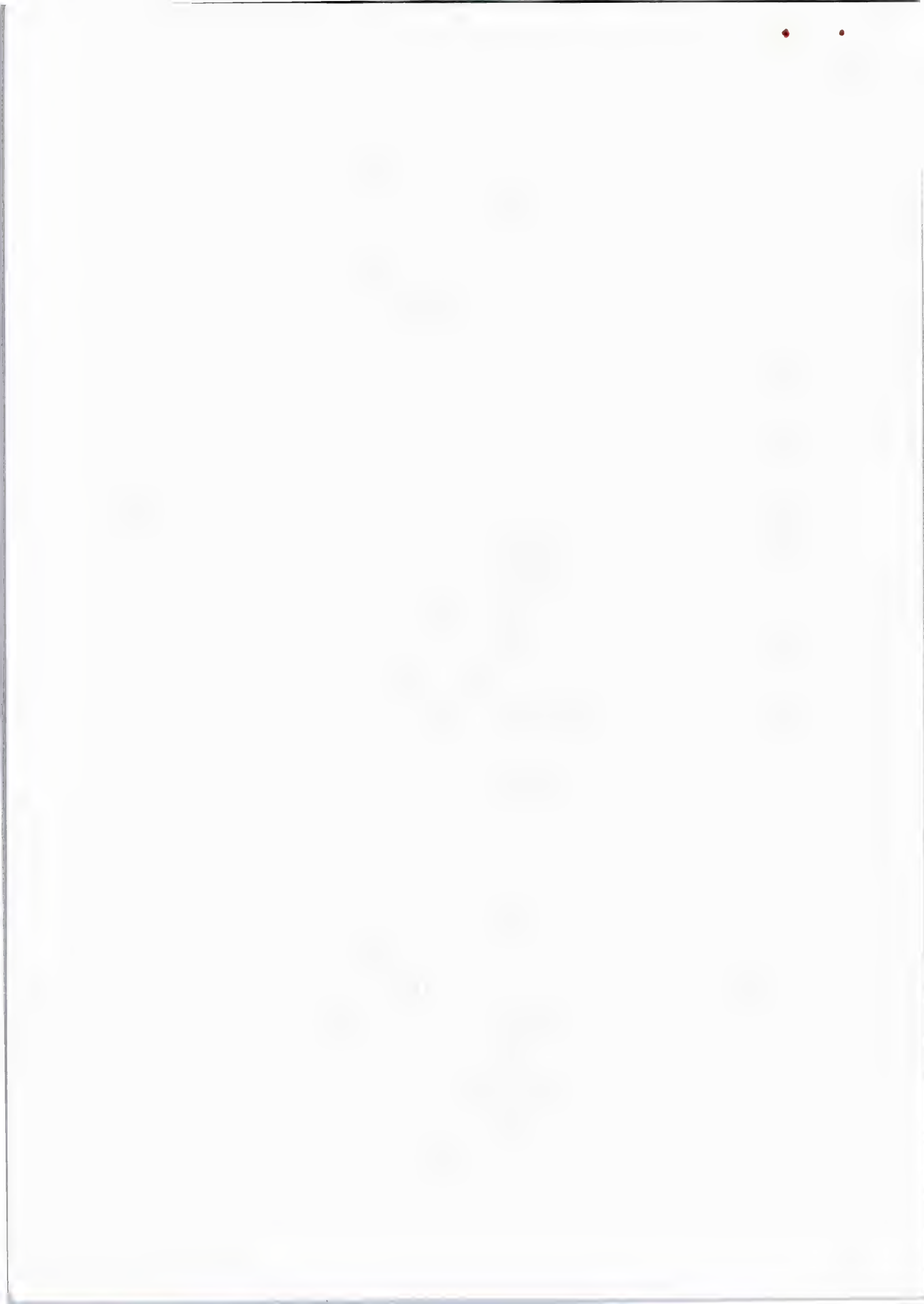
The "Gold Star" Concept

Within sections of the Department of Trade and Industry, value is seen in introducing the "Gold Star" concept for small firms. The idea is that firms could apply to be considered for inclusion on a list of firms considered as having export potential or genuine import-substitution potential. Industry liaison officers of the Department of Trade and Industry (consulting as necessary with DFC, banks, customers and others where required) would examine all aspects of the firm - managerial, financial, technical - and determine that the management were truly entrepreneur in character, not gamblers or rogues. It is seen that relatively only a few companies would make the grade and become "gold star". However, those that did would be considered important enough in the economy to get special attention for finance, Government purchasing, and other needs as they arose.

The Minister of Finance touched on this subject in the 1977 Budget - see the extract on page 14.

A similar concept has proved of value in the United States.

"Occasionally a federal agency may doubt the productivity or financial competency of a small firm whose bid on a contract is the lowest, and therefore should entitle the small firm to an award. SBA's Certificate of Competency (COC) program permits the SBA to make a judgment as to the productive or financial competence of the firm; when that judgment is favourable the federal agency concerned is required by law to make the award to the lowest bidder. In 1975, the COC program led to savings to the government of over \$8 million. This represented the aggregated difference between low bidders and the next lowest bidders."⁽³⁾

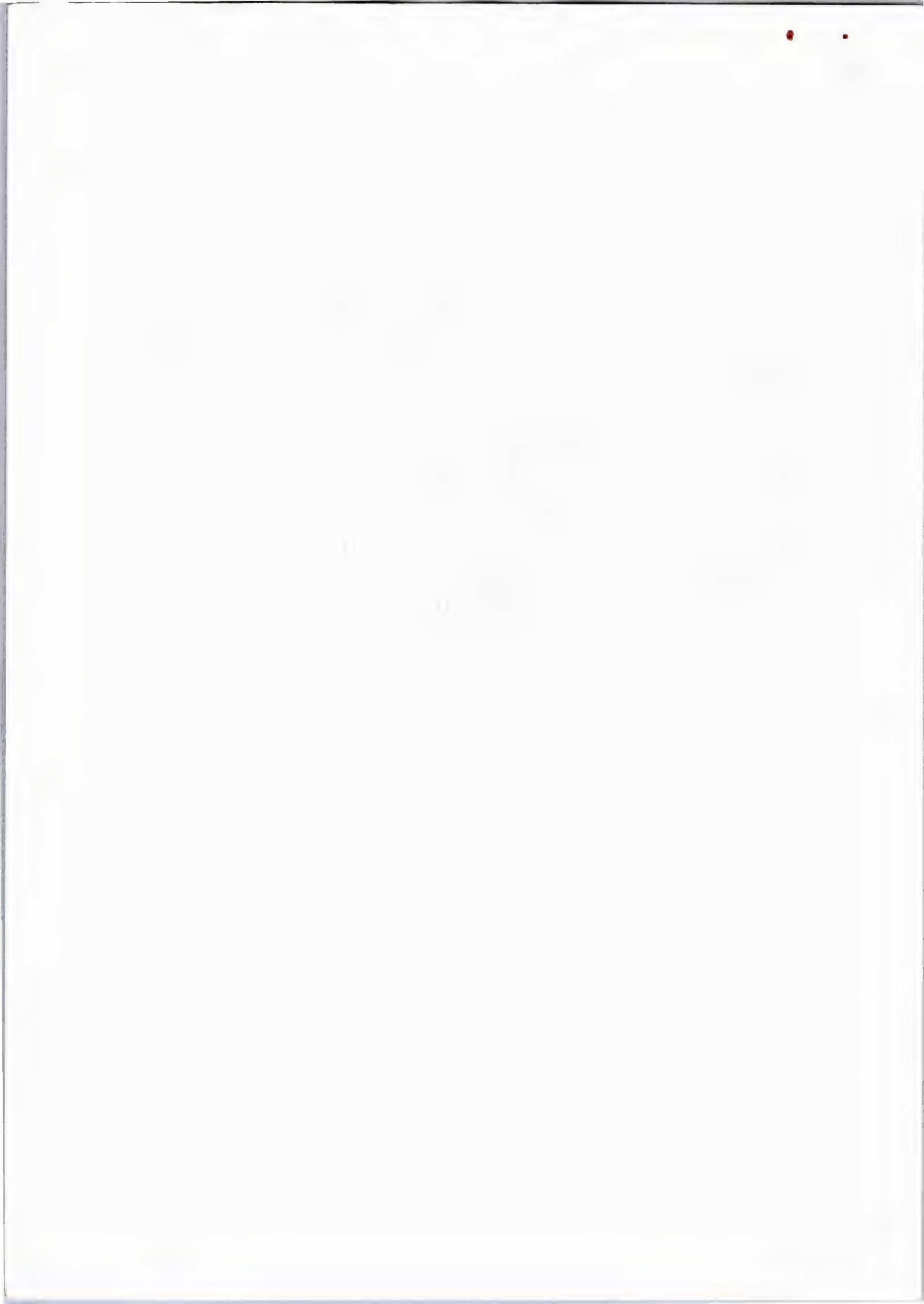


The introduction of this scheme here should remove some of the worry that Government departments might have about the ability of New Zealand small firms to cope and will give these firms a standard to aim for.

Program Manager

One of our problems (at least in the Ministry of Defence) in setting up and following through a contract for the supply of equipment from local industry is that no one seems to be responsible to make it go. Using normal administrative arrangements, many people are involved and no one has the overall job of following the order through and sorting out any difficulties.

In the United States, all defence contracts come under the supervision of a program manager appointed for each contract. He is responsible for all parts of the contract - preparing specifications, calling for tenders, discussions with firms, monitoring progress and sorting out any problems, checking on quality controls and watching final tests.⁽¹⁹⁾ It is considered that the use of a program manager to follow through similar contracts here would be of major value, particularly in dealing with small firms. I can call to mind several projects within the Ministry of Defence that would not have foundered if this had been done.



VI SUMMARY

Government has an essential role in fostering small industry. However, in the words used in the report of the Task Force on Economic and Social Planning:

"There is no single act that can achieve the changes needed to stimulate efficient industrial expansion. The creation of a suitable environment for industrial change and growth will be dependent on many factors and policy instruments working together to stimulate and encourage growth in desired directions." (6)

Some of these factors which have been discussed in this paper. Government now needs to take early action to:

- . Establish Small Business Agency.
- . Transfer more government R & D into industry.
- . Insist that small firms get a fair share of government purchases.
- . Introduce stronger directives on local purchasing by government departments.
- . Place more repair and maintenance work with industry.
- . Accept extra time involved and provide for extra cost outside department's normal budget.
- . Strengthen Defence and Trade and Industry local production teams.
- . Provide production design and development team in Ministry of Defence.
- . Look at taxation problems of small firms.
- . Make finance for selected small firms more easily available.
- . Reduce requirements for statistical returns from small firms.
- . Introduce standardised documentation and provide procedural pamphlets.
- . Set up equipment loan pool.
- . Establish better technology transfer procedures.
- . Revise rules for development, prototype and pre-production contracts.
- . Ensure that departmental specifications are not unnecessarily restrictive and that they don't rule out local industry.
- . Allow New Zealand tenders a larger margin relative to overseas tenders.
- . Bring in "offset" programs.
- . Introduce "gold star" concept for small firms.
- . Use project managers to supervise local contracts.



REFERENCES

1. Budget, 1977. Government Printer, Wellington. July 1977.
2. New Zealand Official Yearbook, 1976. Department of Statistics, Wellington. October 1976.
3. Williams, C. and Simmons, K. Strategy for the NSF Intergovernmental Science and Public Technology/Industrial Program to Enhance Technological Innovations from and Capacity of the Small Business Community. Williams (Charles W.) Inc., Alexandria, Va. October 1976.
4. Small Firms. Report of the Committee of Enquiry on Small Firms (Chairman, J.E. Bolton). HM Stationery Office, London. November 1971.
5. Pound, C.F.W. The Defence Program and National Industrial Development. Defence Research Analysis Establishment, Ottawa. April 1973.
6. New Zealand at the Turning Point. Report of the Task Force on Economic and Social Planning. (Chairman, Sir Frank Holmes), Wellington, December 1976.
7. Stanners, L.S. Defence Production Assistance to Industry. Paper given at the Defence Production Seminar, Auckland. March 1973.
8. 1975 Review. Naval Research Laboratory, Washington, D.C. 1976
9. Program of Research, Development, Test and Evaluation, FY 1978. The Department of Defense. Overview Statement by The Honourable Malcolm R. Currie, Director of Defense Research & Engineering to the 95th Congress. January 1977.
10. Pernase, E.E. Application of Research and Development in New Zealand's Second Generation Industrialisation. Paper for Conference on Conserving Resources. Wellington, May 1975.
11. National Research Advisory Act, 1963.
12. Probine, M.C. Development of "in house" R and D in this country. N.Z. Economist, March 1977.
13. Probine, M.C. It's not the research that costs the money. N.Z. Economist, April 1977.
14. Australian Defence White Paper presented to Parliament by Minister of Defence. Australian Government Publishing Service, Canberra. November 1976.
15. Bolt, Air Marshal R.B. Defence Production. Address to Defence Production Seminar, Auckland. March 1973.
16. A Survey of the New Zealand Electronics Industry. Electronics Advisory Committee, 1973.



17. National Development Conference : Plenary Session. Report of Proceedings, August 1968.
18. Pre-production Orders. Industrial Development, Vol 1, No. 2, July 1971.
19. Introduction to Military Program Management. Logistics Management Institute, Washington D.C, March 1971.
20. Eltringham, D.H. Australian Industry Participation in Defence Procurement. Pacific Defence Reporter, June 1977.



PRE-PRODUCTION ORDERS

Expanded financial provision which may assist technological development is now available to manufacturers through an addition to section 10 of the Government Stores Board Instructions.

Within the original section 10 of the Instructions, Government departments were able to reimburse private firms for special development work by means of development contracts. These contracts are awarded when a department requires the design and development of a special product but they do not provide any assurance of subsequent orders.

Useful developments achieved under this system were lightweight pack radio sets and tree-pruning platforms for the Forest Service, and for the Navy, asbestos vinyl tiles for use on ships, and a panel bolting system.

With a view to further encouraging new technological development and domestic production of goods previously imported, the National Development Conference recommended (Recommendation 427) that:

The Government endorse the principle of pre-production orders, and take such steps as may be necessary to enable this method of industrial assistance to be used.

Pre-production orders make provision for exemption from the normal Government requirement that stores must be purchased by competitive quotation, and permit a department requiring a particular product to place an order with a selected New Zealand manufacturer provided that certain criteria are met. These criteria are set out in instruction 10-4 of the G.S.B. Instructions.

Government would welcome approaches from manufacturers concerning development projects, including any projects for products at present being imported. For the benefit of those interested in development contracts or pre-production orders, the full text of section 10 of G.S.B. Instructions is set out.

10-1. Policy

(1) *In the course of their activities, departments may require experimental equipment, apparatus, or prototypes for which it is not practical or expedient to prepare suitable specifications or otherwise provide suitable information on which competitive tenders may be called. They may similarly require to utilise technical and professional skills available in the private sector to achieve a desired*

result in the most effective manner. Supply is arranged by means of development and prototype contracts.

(2) *It is Government policy to encourage industrial development through co-operation with industry in the manufacture of new products, designed and/or developed in New Zealand, and which may have export potential or commercial application in addition to their Government use. This is effected in appropriate circumstances through the use of pre-production or incentive orders on selected suppliers without the calling of competitive tenders. These orders may be placed on the manufacturer for a period of time, say, 5 years. This gives the manufacturer a greater assurance of a return on his original investment.*

(3) *General exemption E9 (53) authorises departments requiring the above supplies to purchase the stores or make arrangements for development and supply "as prescribed in section 10 of this manual". The following paragraphs set out the procedures to be followed.*

10-2. Prototype Contracts

(1) *A department requiring the manufacture of a prototype may arrange a contract with a selected supplier who is considered capable of carrying out the assignment.*

(2) *The following must be complied with:*

(a) *The contract must call for the manufacture of a prototype and the production of a specification and/or drawings that will permit the calling of competitive tenders for subsequent supplies.*

(b) *The Inventions Development Authority is to be given details of the proposal before the contract is entered into, in order to consider the possibility of wider use of the proposed prototype and to protect possible patent rights.*

(c) *The basis of payment for the contract is to be agreed in writing between the department and the firm concerned before the work is commenced.*

(3) *In negotiating the basis for payment, departments are to observe the following:*

(a) *Firms are entitled to reasonable payment for the employment of professional skill and experience on the work involved, and to adequate reimbursement for all outgoings and overhead charges thereon.*



(b) Each prototype contract is to be regarded as a separate transaction and firms concerned are to be informed in writing that they will not be entitled to any special consideration or protection in the event of tenders subsequently being invited for the manufacture of supplies attributable directly or indirectly to the work undertaken by them.

(c) The basis of payment for prototype contracts is to be agreed to in each instance on behalf of departments concerned by two senior officers, one of whom is to be an appropriate technical officer. The actual basis will depend upon the circumstances in each case.

(4) When a firm desires to undertake ^{the development of} a prototype ~~contract~~ without charge to the Department concerned, its offer may be accepted provided:

(a) An offer of payment has first been communicated to such firm in writing:

(b) The firm undertakes in writing, before commencing the work, to carry out the project without charge to the department, and without prejudice to any subsequent action the Government may take as the direct or indirect result of such work undertaken by the firm.

10-3. Development Work

(1) Development work which does not ^{necessarily} require the manufacture of a prototype or the production of drawings and specifications, e.g., modifications to existing equipment, may be arranged by departments provided the basis of payment for the development work is agreed in writing between the department and the firm concerned before the work is commenced.

(2) Departments are to comply with the instructions set out in 10-2 (3) and (4) above when negotiating the basis of payment for development work.

(3) Departments are to ensure that all development work is scrutinised for possible patenting on behalf of the Crown and the Inventions Development Authority should be consulted whenever the possibility of patenting arises.

10-4. Pre-production Orders

(1) Where a department wishes to place a pre-production or an incentive order on a selected supplier for one or more units of a prototype previously developed either:

(a) as the result of public research, i.e., developed by a Government department, or

(b) by industry,

then the approval of the Board must first be obtained.

(2) The following information should be submitted in application for approval:

(a) Description of the product.

(b) Departmental requirement and essentiality to the department's needs.

(c) Proposed supplier.

(d) Estimate (where possible) of price.

(e) Any further background information considered essential.

(3) The Board will consult with the Departments of ~~Industries and Commerce~~ ^{Trade and Industry} and Scientific and Industrial Research where this is considered desirable and applications will be evaluated on the following basis:

(a) Development of the product must be in the national interest and it should preferably be capable of use in industry, as well as in Government departments, and having export potential.

(b) The commercial development of the product must involve a substantial investment at a higher than normal commercial risk.

(c) The product must be essential to the applicant's needs.

(d) The product must incorporate a reasonable New Zealand content and be ordered to meet acceptable specifications.

(e) The estimated prices must compare favourably with those of the comparable imported alternatives or, where a higher price is sought, then the performance of the New Zealand product must be considered superior to that of the imported product.

(4) When approvals are granted, departments will be instructed to liaise with the Inventions Development Authority in respect of orders resulting from public research to ensure that the Authority's requirements are fully covered in respect of patent rights and royalties. This action is to be taken before any contract is entered into.

10-5. Disputes

Any dispute between a department and a firm on matters arising out of the above is to be referred to the Board for direction.

100

APPENDIX II

FIELD TESTS

Extracts from D.C. Gall, Field Instruments. J.Sci.Inst., Vol. X, No. 7, July 1933.

"These instruments must be light and comfortable to hold, because often enough they will have to be carried every day and all day long over rough mountainous country. They must remain undamaged by hard knocks, an occasional tumble of the bearer, by tropical downpours, or even accidental total immersion at some difficult river crossing. They must withstand exposure to tropical sunlight without deterioration, nor with too great an absorption of heat, which may burst them if sealed, and to arctic temperatures without seizing of bearings or serious calibration errors. Ants and other insects will attack their organic substance. Dust of microscopic fineness will try to penetrate their vital parts. Mildew and rot will obscure their scales. Moisture will condense and recondense within and without. Metals corrode and non-metals corrupt. They will be attacked by all the inanimate forces of dissolution, wind, water, heat and cold, and by man's carelessness under the spur of discomfort."

"Those about to embark upon field work might well ask the following of their instruments, with reservations according to the actual conditions to be encountered:

- (1) Has the apparatus actually been used in similar field conditions?
- (2) Are they well enough packed for transport and to survive a customs examination? This refers especially to fine suspensions.
- (3) Are they sufficiently light to be carried in rough country, and waterproof?
- (4) Can they be landed by surf boats drenched with spray?
- (5) Can they be packed up wet, in the field, without going rotten?
- (6) Can the field cases be dropped without damage, or pointers bending?
- (7) Will they stand vibration?
- (8) Can they be sat on?
- (9) Are there uncomfortably sharp corners to get knocked?
- (10) Can they be quickly set up and dismantled?
- (11) Are there no delicate irreplaceable suspensions or alternatively adequate spares?
- (12) Are the levelling adjustments adequate for the actual field conditions? - mountainside, bog, glacier, tall grass or confined space; special tripods are sometimes necessary.
- (13) Will they be usable in a gale? Will they blow over?
- (14) If a telephone is used can it be heard in a wind or used in the rain? Waterproof leads and a fur-covered helmet will help.
- (15) Are the contacts non-corrodable, and accessible for cleaning?
- (16) Are they replaceable when worn?
- (17) Are cleaning tools provided?
- (18) Are all wearing parts replaceable, and spares really interchangeable?
- (19) What can break, wear or get lost?
- (20) Can it be repaired in the field?
- (21) Are there sufficient spares and tools?
- (22) What are the temperature errors?
- (23) Will the metals, lubricants, insulation, recording ink, or packing materials used, stand the climate, the temperature, humidity, or corrosive sea air?
- (24) How can the calibration be checked?
- (25) Are there adequate carrying frames or packs?
- (26) Are there batteries which require charging or renewing, will they freeze, dry up or upset?

Field Station No. 1000

1. The first thing I noticed when I stepped out of the plane was the cold, crisp air. It felt like a fresh blanket after a long, warm journey. The ground below was a mix of brown and green, with patches of snow still clinging to the higher elevations. The sun was shining brightly, casting long shadows across the landscape. I took a deep breath and felt a sense of adventure wash over me. This was my first time in the field, and I was determined to make the most of it.

2. As I walked through the field, I noticed a variety of plants and animals. Some were familiar, while others were completely new to me. I took notes on everything I saw, trying to capture as much detail as possible. The birds were particularly interesting, with their colorful plumage and unique calls. I spent a lot of time observing their behavior and trying to understand their habits.

3. The weather was perfect for the day, with a clear blue sky and a gentle breeze. I felt lucky to have such good conditions. The terrain was challenging, with steep hills and rocky paths. I had to be careful not to slip or fall. Despite the difficulties, I was enjoying every minute of it. The sense of discovery and the beauty of the natural world were truly inspiring.

4. I continued to explore the field, taking in the sights and sounds of the environment. The air smelled fresh and clean, with a hint of earthiness. I noticed a small stream flowing through the valley, its water clear and cold. The surrounding forest was dense and lush, with a variety of trees and plants. I was fascinated by the complexity of the ecosystem and the way everything seemed to fit together.

5. The day was long and tiring, but it was also incredibly rewarding. I had learned so much about the field and the creatures that lived there. I felt a sense of accomplishment and pride in what I had achieved. The experience had been a truly unforgettable one, and I was looking forward to sharing it with others. I knew that this was just the beginning of my journey into the world of field research.

6. As the sun began to set, I found myself reflecting on the day's events. The beauty of the landscape and the diversity of life had left a lasting impression on me. I felt a sense of awe and wonder at the complexity of the natural world. I knew that I had gained a new perspective on the world around me, and I was grateful for the opportunity to have this experience. I was excited to see what the future held for me in the field.

7. The night was quiet and peaceful, with a soft glow from the stars in the sky. I felt a sense of calm and relaxation, knowing that I had successfully completed my first day in the field. I was proud of myself and the progress I had made. I knew that this was just the start of a long and exciting journey, and I was ready to face whatever challenges lay ahead. I was determined to continue to learn and grow, and I was confident that I would achieve my goals.